

## REMARKS

Claims 1, 21, 36-37 and 39 are amended. Claims 4-5, 31, 34-35, 45 and 49 are cancelled. New claims 60-79 are added. Reconsideration of the application in view of the amendments and the remarks to follow is requested.

Claim 59 is allowed. Accordingly, claims 60-61 which depend from claim 59 are allowable.

Claims 1-5 and 7 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kilgore et al. (6,200,412) in view of Qian et al. (6,136,211). Claim 6 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Kilgore et al. in view of Qian et al. and further in view of Williams et al. (5,647,953). Claims 10-13 and 16-19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Cui et al. (5,965,463) in view of Yanagida (5,445,712) and further in view of Qian et al. Claims 21-26, 28, 30 and 58 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kilgore et al. in view of Qian et al. and further in view of Saito et al. (5,681,424). Claim 27 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Kilgore et al. in view of Qian et al. and Saito et al. and further in view of Williams et al. Claims 31-35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kilgore in view of Qian and Saito and further in view of Yanagida. Claims 36-42 and 44-46 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Cui et al. in view of Hong (6,103,070) Kilgore et al. and further in view of Saito et al. Claims 47-50 and 53-57 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Cui et al. in view of Yanagida and further in view of

Saito et al. and Qian et al.

Regarding the obviousness rejection against claim 1, such claim recites a gas comprises O<sub>2</sub> and a hydrogen component, and wherein the hydrogen component and O<sub>2</sub> are provided in a chamber during a plasma etching at a volumetric ratio of one to the another of at least 0.1:1 of O<sub>2</sub> to the hydrogen component. The Examiner relies on a combination of art with specific reference to teachings of Kilgore (page 3 of paper no. 12) which provides a hydrogen at a flow rate of 50-1000 sccm and oxygen at a flow rate of 0-500 sccm (col. 6, lines 40-45). The reference is completely devoid of any relationship between the two flow rate ranges, and therefore, there are **475,000 possible flow rate ratio combinations** of oxygen to the hydrogen component (950 times 500 = 475,000). Out of these 475,000 possibilities, the Examiner has picked one flow rate ratio to allegedly teach the recited ratio of claim 1. It is inconceivable that a reference teachings to **475,000 possible ratios** could be stated to teach or suggest one specific flow rate ratio as recited in claim 1. In no fair or reasonable interpretation do the teachings of Kilgore, in combination with the art of record, teach or suggest the positively recited ratio of claim 1, and therefore, the obviousness rejection fails. Claim 1 is allowable.

Claims 2-3, 6-7 and 62-66 depend from independent claim 1, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

Regarding the obviousness rejection against claim 10, claim 10 recites a

gas comprising a carbon component .... [and] an oxygen component forming an oxygen and carbon compound mixture, and wherein the carbon compound is provided at from about 5% to about 10% by volume of the oxygen and carbon compound mixture. The Examiner relies on a combination of art with specific reference to Cui to allege such limitation is taught at col. 8, lines 63-65, stating such teaching reads on a volumetric relationship **between** the carbon and oxygen (page 18 of paper no. 12). However, the recitation of claim 10 is relative to a **compound mixture**, not between the carbon and oxygen.

Cui teaches  $C_4F_8$  as an etching gas within a compound mixture that includes a gas flow of 20 sccm of  $C_4F_8$ , 20 sccm of  $CHF_3$ , 10 sccm of  $O_2$ , 450 sccm of Ar, and varying amounts of  $SiH_4$  (col. 8, lines 60-66). The Examiner compares only the 20 sccm of  $C_4F_8$  relative the 10 sccm of  $O_2$ , and not relative the entire compound mixture. First, the Examiner is not considering the entirety of the Cui compound mixture to determine the oxygen and carbon percentage volume each comprises of the **compound mixture**, as recited in claim 10. Additionally, the phrase "varying amounts of  $SiH_4$ " makes the teaching indefinite regarding any possible teaching to the volume percentage of the  $C_4F_8$  and  $O_2$  relative the Cui compound mixture because no specific amount of the  $SiH_4$  is disclosed which is needed to determine the percentage volume of the respective components of the **compound mixture**. Therefore, it is inconceivable that the Cui, with the combination of the art of record, teaches or suggests the carbon compound is provided at from about **5% to about 10% by volume** of the oxygen and carbon compound mixture as positively recited in claim 10. Therefore, the

obviousness rejection fails and claim 10 is allowable.

Claims 11-13, 16-19, 67 and 68 depend from independent claim 10, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

Regarding the obviousness rejection against claim 21 based on Kilgore, Qian and Saito, such claim is amended to recite a gas comprising at least  $H_2$  and  $NH_3$ . The amendment language is supported by the originally-filed application by an exemplary embodiment disclosed on page 4. Kilgore, Qian and Saito fail to teach or suggest  $NH_3$ , and an electronic search of each reference verifies the same. Accordingly, it is inconceivable that Kilgore, Qian and Saito, in any combination, could teach or suggest a gas effective to etch a polymer comprising at least  $H_2$  and  $NH_3$  as recited in claim 21. The combination of art fails to teach or suggest a positively recited limitation of claim 21, and therefore, claim 21 is allowable.

Claims 22-28, 30, 32-33, 58 and 69-71 depend from independent claim 21, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

Regarding the obviousness rejection against claim 36 based on Cui, Hong, Kilgore and Saito, the claim is amended to recite a gas having the one or more components comprising at least  $H_2$  and  $CH_4$ . The amendment language is supported by the originally-filed application by an exemplary embodiment

disclosed on page 4. Cui, Hong, Kilgore and Saito fail to teach or suggest CH<sub>4</sub>, and an electronic search of each reference verifies the same. Accordingly, it is inconceivable that Cui, Hong, Kilgore and Saito, in any combination, could teach or suggest a gas having one or more components comprising at least H<sub>2</sub> and CH<sub>4</sub> as recited in claim 36. The combination of art fails to teach or suggest a positively recited limitation of claim 36, and therefore, claim 36 is allowable.

Further regarding the obviousness rejection against claim 36, such claim recites negatively biasing a wafer receiver to a range of 100-400 volts. The Examiner provides a combination of art and specifically refers to Hong to suggest the limitation is taught at col. 10, lines 32-64 of Hong. The motivational rationale presented by the Examiner to use Hong to allegedly modify the other references (Cui, Kilgore and Saito; pg. 11 of paper no. 12) is stated as, Hong teaches a pedestal biased voltage in the range of a negative 100 volts is satisfactory for many applications. However, such a general statement, in no fair or reasonable interpretation, teaches or suggests that such an application is appropriate to modify the inventions of the other references, and therefore, the motivational rationale is inappropriate and fails. Effectively, the Examiner is simply stating that since the references can be modified by the teachings of Hong, such is obvious to do so. This type of motivational rationale is contrary to well established Federal Circuit law. The Examiner is respectfully reminded that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. MPEP §2143.01 (8<sup>th</sup> edition) *citing In re Mills*,

916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so". 916 F.2d at 682, 16 USPQ2d at 1432; MPEP §2143.01; See also *In re Finch*, 972 F.2d, 1260, 23 USPQ2d, 1780 (Fed. Cir. 1992). The Examiner's alleged motivational rationale, satisfactory for many applications, is simply a general statement of that does not provide the proper desirability for modifying the other references, pursuant to the above authority. The obviousness rejection is based on an inappropriate motivational rationale, and therefore, the obviousness rejection fails. Claim 36 is allowable.

Claims 37-42, 44-46 and 72-74 depend from independent claim 36, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

Regarding the obviousness rejection against independent claim 47 based on Cui, Yanagida, Saito and Qian, such claim is amended to recite a hydrogen component comprising at least a hydrocarbon and  $\text{NH}_3$ . The amendment language is supported by the originally-filed application by an exemplary embodiment disclosed on page 4. Cui, Yanagida, Saito and Qian fail to teach or suggest  $\text{NH}_3$ , and an electronic search of each reference verifies the same. Accordingly, it is inconceivable that Cui, Yanagida, Saito and Qian, in any combination, could teach or suggest a hydrogen component comprising at least a hydrocarbon and  $\text{NH}_3$  as recited in claim 47. The combination of art fails to

teach or suggest a positively recited limitation of claim 47, and therefore, claim 47 is allowable.

Further regarding the obviousness rejection against independent claim 47, such claim recites after a first plasma etching and with a wafer on a electrostatic chuck, providing the electrostatic chuck at ground or floating potential. In Applicant's previous response filed December 30, 2002, Applicant pointed out to the Examiner that the combination of art fails to teach such limitation. The Examiner had previously (and still maintains) that the combination of art, particularly Qian teaches such limitation at col. 7, lines 6-7 and lines 55-57 (page 16 of the present office action, paper no. 12). However, as Applicant pointed out, Qian teaches that the other electrodes in a chamber 30, not the electrostatic chuck 45, are the electrodes that are at ground or at floating potentials. Respectfully, the Examiner has not addressed this lack of teachings of the art to the recited limitation 47. In no fair or reasonable interpretation does Qian, singularly or in any combination with the art of record, teach or suggest providing the **electrostatic chuck** at ground or floating potential as positively recited in independent claim 47. Claim 47 is allowable.

Claims 48, 50, 53 and 75-77 depend from independent claim 47, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

Regarding the obviousness rejection against independent claim 54, such claim recites after a first plasma etching and with a wafer on a electrostatic

chuck, providing the electrostatic chuck at ground or floating potential. Providing the electrostatic chuck at ground or floating potential is not taught or suggested by the art of record. For this reason, claim 54 is allowable.

Claims 55-58 and 78-79 depend from independent claim 54, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.


Further, Applicant herewith submits a duplicate copy of the Information Disclosure Statement and Form PTO-1449s filed together with this application on October 2, 2000. No initialed copy of the Wolf cite on the PTO-1449 has been received back from the Examiner. To the extent that the submitted reference listed on the Form PTO-1449 has not already been considered, and the Form PTO-1449 has not been initialed with a copy being returned to Applicant, such examination and initialing are requested at this time, as well as return of a copy of the initialed Wolf cite on the Form PTO-1449 to the undersigned.

This application is now believed to be in immediate condition for allowance, and action to that end is respectfully requested. If the Examiner's next anticipated action is to be anything other than a Notice of Allowance, the undersigned respectfully requests a telephone interview prior to issuance of any such subsequent action.



Respectfully submitted,

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